

METHOD AND APPARATUS FOR MULTI-DIMENSIONAL SHAPE  
REPRESENTATION VIA SHOCK FLOWS

ABSTRACT OF THE DISCLOSURE

A method and apparatus for representing a multi-dimensional shape includes deriving a shock scaffold from an unorganized point cloud. The shock scaffold is derived by shocks recovered from collisions of logical wavefronts. The logical wavefronts are initialized from selected points in the unorganized point cloud. Shocks hold topology information including speed accelerations and direction from boundaries of the multi-dimensional shape. The shocks recovered from wavefront collisions define shock sheets of the multi-dimensional shape. Representative shock points of the shock sheets are paired to find shock curve representatives as another set of special shock points. The latter are also paired to find shock vertices and the remaining nodes and links defining the full shock scaffold representation of the multi-dimensional shape.